Philosophical Magazine Letters

Physics of Condensed Matter

PHILOSOPHICAL MAGAZINE LETTERS

Joint Editors

Professor E. A. Davis — Department of Physics and Astronomy, University of Leicester, UK
Dr S. R. Elliott — Department of Physical Chemistry, University of Cambridge, UK

North American Editor

Dr J. L. Smith — Los Alamos National Laboratory, USA

Associate Editors

Professor D. J. Bacon — Department of Materials Science and Engineering, University of Liverpool, UK
Dr M. J. Goringe *and* Dr M. L. Jenkins — Department of Materials, University of Oxford, UK
Professor A. B. Lidiard — Department of Theoretical Chemistry, University of Oxford, UK
Dr W. M. Stobbs — Department of Materials Science and Metallurgy, University of Cambridge, UK

Regional Editors

Dr C. Ayache — Laboratoire de Cryophysique, Centre d'Études Nucléaires de Grenoble, France
Professor R. M. Bradley — Department of Physics, Colorado State University, USA
Dr D. J. H. Cockayne — Electron Microscope Unit, University of Sydney, Australia
Dr M. Duesbery — Naval Research Laboratory, Washington, USA
Professor J. D. Embury — Department of Materials Science and Engineering, McMaster University, Canada
Professor Dr E. O. Göbel — Fachbereich Physik, Philipps-Universität Marburg, Germany
Professor F. Hensel — Fach Physikalische Chemie, Philipps-Universität Marburg, Germany
Professor H. Kamimura — Faculty of Science, Science University of Tokyo, Japan
Professor M. Kaveh — Department of Physics, Bar-Ilan University, Israel
Dr M. Kléman — Laboratoire de Minéralogie-Cristallographie, Université de Paris-Sud, France
Professor K. Morigaki — Faculty of Engineering, Yamaguchi University, Japan
Professor C. N. R. Rao — Solid State and Structural Chemistry Unit, Bangalore, India
Dr Cheng Ruguang — Shanghai Institute of Ceramics, P.R. China
Professor Dr W. Schilling — Institut für Festkörperforschung der Kernforschungsanläge Jülich, Germany
Professor C. Schlenker — Laboratoire d'Études des Propriétés Électroniques des Solides, CNRS-Grenoble, France
Professor A. Seeger — Institut für Physik, Max-Planck-Institut für Metallforschung, Stuttgart, Germany
Dr V. Smid — Institute of Physics, Czechoslovak Academy of Science, Praha, Czech Republic
Dr R. A. Street — Palo Alto Research Center, Xerox Corporation, USA
Dr M. Tosi — Scuola Normale Superiore, Pisa, Italy
Professor U. Valdrè — Dipartimento di Fisica, Università di Bologna, Italy
Professor V. Vitek — Department of Materials Science and Engineering, University of Pennsylvania, USA

Consultant Editors

Professor Sir Nevill Mott — Cavendish Laboratory, University of Cambridge, UK
Professor B. R. Coles — Department of Physics, Imperial College, UK

Subscription Information

Philosophical Magazine Letters (*ISSN 0950–0839*) is published monthly by Taylor & Francis Ltd, 4 John Street, London WC1N 2ET, UK.

Annual subscription 1995 £203 US$335.

Second class postage paid at Jamaica, New York 11431, USA. US Postmasters: Send address changes to *Philosophical Magazine*, Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003. Air freight and mailing in the USA by Publications Expediting Inc., 200 Meacham Avenue, Elmont, New York 11003.

Printed in UK by Burgess Science Press, Rankine Road, Basingstoke, Hampshire RG24 8PR, UK. The paper used in this publication has a specified pH value on final manufacture of not less than 7·5 and is therefore 'acid free'.

Dollar rates apply to subscribers in all countries except the UK and the Republic of Ireland where the pound sterling price applies. All subscriptions are payable in advance and all rates include postage. Journals are sent by air to the USA, Canada, Mexico, India, Japan and Australasia. Subscriptions are entered on an annual basis, i.e. January to December. Payment may be made by sterling cheque, dollar cheque, international money order, National Giro, or credit card (Amex, Visa, Mastercard/Access).

Orders originating in the following territories should be sent direct to the local distributor. **India:** Universal Subscription Agency Pvt. Ltd, 101–102 Community Centre, Malviya Nagar Extn, Post Bag No. 8, Saket, New Delhi 110017. **Japan:** Kinokuniya Company Ltd, Journal Department, PO Box 55, Chitose, Tokyo 156. **USA, Canada and Mexico:** Taylor & Francis Inc., 1900 Frost Road, Suite 101, Bristol, Pennsylvania 19007. **UK and all other territories:** Taylor & Francis Ltd, Rankine Road, Basingstoke, Hampshire RG24 8PR.

CONTENTS OF VOL. 71 Nos 1–6

NUMBER 1—JANUARY

The annihilation of superdislocations in Ni_3Al during deformation at room temperature
By XIAOLI SHI, G. SAADA and P. VEYSSIÈRE 1

Production and characterization of single quasicrystals of the Al–Pd–Mn icosahedral phase
By M. BOUDARD, E. BOURGEAT-LAMI, M. DE BOISSIEU, C. JANOT, M. DURAND-CHARRE, H. KLEIN, M. AUDIER and B. HENNION 11

Implications from pre-straining experiments on emerging kink-based models for anomalous flow in $L1_2$ alloys
By D. M. DIMIDUK and T. A. PARTHASARATHY 21

An improved multislice method for calculating high-energy electron diffraction and imaging under conditions of inclined illumination
By J. H. CHEN, WANG YUANMING, X. J. LUO, L. Y. DING and X. L. CHENG 33

Grain-boundary distribution in hot-strained 80 wt% Ni–20 wt% Cr alloy
By V. N. DANILENKO, V. YU. GERTSMAN and R. Z. VALIEV 39

Effect of ternary additions on the structural stability of Ti_3Al
By J. ZOU, C. L. FU and M. H. YOO 45

Transmission electron microscopy study of defects in a directionally grown Al–Cu–Co–Ge single quasicrystal
By L. F. CHEN, H. CHEN and F. H. LI 51

Quartz amorphization: a dynamical instability
By G. W. WATSON and S. C. PARKER 59

Superlattice ordering in the low-temperature icosahedral phase of Al–Pd–Mn
By T. ISHIMASA 65

The structure and dynamics of the $CaF_2(110)$ surface at high temperatures
By P. J. D. LINDAN 75

NUMBER 2—FEBRUARY

Ar^+-ion-irradiation-induced phase transformations in an $Al_{70}Co_{15}Ni_{15}$ decagonal quasicrystal
By YUELING QIN, RENHUI WANG, QINGLIN WANG, YIMIN ZHANG and CUNXU PAN 83

Intrinsic deformation properties of icosahedral Al–Pd–Mn single quasi-crystals
By M. FEUERBACHER, B. BAUFELD, R. ROSENFELD, M. BARTSCH, G. HANKE, M. BEYSS, M. WOLLGARTEN, U. MESSERSCHMIDT and K. URBAN 91

***In-situ* observation of dislocation motion in icosahedral Al–Pd–Mn single quasicrystals**
By M. WOLLGARTEN, M. BARTSCH, U. MESSERSCHMIDT, M. FEUERBACHER, R. ROSENFELD, M. BEYSS and K. URBAN 99

Thermal-history-dependent magnetization behaviour in Cr/Cu multilayers
By SATISH VITTA 107

The meaning of the oxygen second-electron affinity and oxide potential models
By J. H. HARDING and N. C. PYPER 113

A three-dimensional structure model of eight-fold quasicrystals obtained by high-resolution electron microscopy
By JIE-CHAO JIANG, SVEN HOVMÖLLER and XIAO-DONG ZOU 123

The structure of the 21 K superconductor $ThPd_xB_{6-2x}$, $x = 0{\cdot}65$, determined by quantitative electron diffraction and through-focus electron holography
By H. W. ZANDBERGEN, E. J. VAN ZWET, J. JANSEN, J. L. SARRAO, M. B. MAPLE, Z. FISK and R. J. CAVA 131

A non-Fibonacci type of orthorhombic decagonal approximant
By H. X. SUI, X. Z. LIAO and K. H. KUO 139

The microcrystalline state of slowly solidified decaprismatic Al–Co–Cu(–Si) needles
By R. WITTMANN, M. FETTWEIS, P. LAUNOIS, R. REICH and F. DÉNOYER 147

The role of oxygen in the formation of titanium-based icosahedral phases and crystal approximants
By J. L. LIBBERT and K. F. KELTON 153

Chemical effects on periodicity and structure of decagonal phases in Al–Ni- and Al–Co-based alloys
By A. P. TSAI, A. INOUE and T. MASUMOTO 161

Vortex dynamics in $La_{1{\cdot}86}Sr_{0{\cdot}14}CuO_4$ studied by magnetoresistivity
By S. L. YUAN, Z. J. YANG, K. KADOWAKI, J. Q. LI, T. KIMURA, H. TAKEYA and K. KISHIO 169

NUMBER 3—MARCH

Observation of crack propagation in amorphous $Al_{88}Ce_2Ni_9Fe$ containing nanoscale crystals
By Y. TANAKA, K. TSUNEMI, S. OMATA, A. SATO and A. INOUE 179

The effects of sulphur incorporation on the optoelectronic properties of hydrogenated amorphous germanium
By T. DRŮSEDAU, D. PANG, J. H. CHEN and P. WICKBOLDT 185

The magnetic behaviour in heterogeneous f.c.c. $Co_{10}Cu_{90}$ melt-spun ribbons
By R. H. YU, X. X. ZHANG, M. KNOBEL and G. SARDIN 193

Diffuse scattering of decagonal $Al_{70}Ni_{15}Co_{15}$ measured with synchrotron radiation
By K. HRADIL, T. PROFFEN, F. FREY, K. EICHHORN and S. KEK 199

On the grey Penrose tiling
By A. SINHA and P. RAMACHANDRARAO 207

NUMBER 4—APRIL

The origin of localized diffuse scattering from icosahedral quasicrystals
By L. E. LEVINE and J. L. LIBBERT 213

Atomic structure of the $\Sigma = 5$, (310)[001] grain boundary in NiAl: a combined electron microscopy and theoretical study
By R. W. FONDA, M. YAN and D. E. LUZZI 221

On the spurious increase in particle volume fraction during coarsening simulations
By T. A. ABINANDANAN 229

Aperiodic tilings related to the Al–Mn–Pd decagonal quasicrystal
By X. Z. LI, F. FREY and K. H. KUO 237

On the behaviour of carrier velocities for high bias fields in a model of disordered molecular solids
By J. J. MEJÍAS and J. M. CASADO 243

NUMBER 5—MAY

Simulation of the early stages of ordering in Ti–15 at.% Al alloy
By J. M. HYDE 247

Activation energy spectra for stress-induced ordering in amorphous materials calculated using Fourier techniques
By A. KASARDOVÁ, V. OCELÍK, K. CSACH and J. MIŠKUF 257

Critical wetting at twin boundaries in Cu–17% Pd near the order–disorder transition
By P. H. H. RONGEN, F. W. SCHAPINK and F. D. TICHELAAR 263

{1$\bar{1}$01} twin dislocation structures in evaporated titanium thin films
By L. A. BURSILL, J. L. PENG, X.-D. FAN, Y. KASUKABE and Y. YAMADA 269

Interfacial structure of {10$\bar{1}$1} twins and twinning dislocations in titanium
By R. C. POND, D. J. BACON and A. SERRA 275

Angularly inhomogeneous piezoelectric piezomagnetic magnetoelectric anisotropic media
By V. I. ALSHITS, H. O. K. KIRCHNER and T. C. T. TING 285

Grain boundary in cemented carbide
By T. SUZUKI, K. SHIBUKI, T. SUZUKI and Y. IKUHARA 289

Erratum 293

NUMBER 6—JUNE

Announcement 295

Electron microscopy of grain boundaries: an application to RE–Fe–B (RE = Pr or Nd) magnetic materials
By Y. ZHU, J. TAFTO, L. H. LEWIS and D. O. WELCH 297

High-resolution electron microscopy observation of a $\frac{1}{2}\langle 112\rangle$ superdislocation in TiAl
By B. J. INKSON and C. J. HUMPHREYS 307

The grain size and strain dependence of the flow stress of polycrystalline iron
By L. GAO and K. C. CHAN 313

The structure of metastable {111}α precipitates in an Al–2·5 wt% Cu–1·5 wt% Mg–0·5 wt% Ag alloy
By H. D. CHOPRA, L. J. LIU, B. C. MUDDLE and I. J. POLMEAR 319

A high-resolution electron microscopy study of copper precipitation in Fe–1·5 wt% Cu under electron irradiation
By H. A. HARDOUIN DUPARC, R. C. DOOLE, M. L. JENKINS and A. BARBU 325

Platelet copper precipitates in silicon: a high-resolution electron microscopy study
By M. EL KAJBAJI and J. THIBAULT 335

Investigation of a decagonal $Al_{70}Co_{15}Ni_{15}$ single crystal by means of high-resolution synchrotron X-ray diffraction
By M. KALNING, W. PRESS and S. KEK 341

A percolation approach to variable-range hopping in high T_c superconducting cuprates
By F. ABDEL-WAHAB and K. SHIMAKAWA 351

Dynamic behaviour of a small atomic cluster on an Ir(001) surface
By C. CHEN, T. T. TSONG, S. LIANG and L. ZHANG 357

Low-frequency dispersion extended to higher frequencies: a new look at relaxor behaviour
By D. SAHA and A. SEN 367

Subject index 377

Index of authors 381